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Between Efficiency and Resilience: The Classification of Companies According to their Sustainability Performance

Sebastian Nagel, Stefanie Hiss, Daniela Woschnack & Bernd Teufel [*]

Abstract: *»Zwischen Effizienz und Resilienz: Die Klassifikation von Unternehmen anhand deren Nachhaltigkeitsleistung«*. In this article, we provide a broad picture of the adaptation of economic classification technologies that were originally used to provide financial information and to classify companies according to their financial performance. The same approach is now available for the benefit of sustainability investors. The adaptation of such financial classification technologies to account for questions of sustainability has been engendered by the growing importance of financial markets and by the recognition of sustainability, as a guiding concept for contemporary societies. Since credit ratings, as well as financial accounting and reporting, are established measures for financial performance, they have inspired the development of similar classification systems for sustainability performance, and can be used to accommodate sustainability investors. We outline the adaptation of financial classification systems to the issue of sustainability and we compare the development and institutionalization, especially as it relates to the current market structure of classification systems in the financial markets, based on both financial and sustainability data. In the second part of this paper we compare the interpretation of social sustainability by three different sustainability accounting and reporting initiatives, in order to illustrate the heterogeneity of the available data applicable to subsequent classification. We point out that the operationalization of the three initiatives differs in respect to the nature and the extent of information requested. While accounting frameworks require relatively few quantitative outcomes, reporting frameworks demand more extensive quantitative and qualitative data. Finally, we discuss the opportunities and difficulties associated with the adaptation of classification systems from the field of finance to the field of sustainability.

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1. Introduction[1]

After the September 2015 revelation of Volkswagen's emissions scandal, Dieselgate, the German automaker was removed from several sustainability indices, such as the Dow Jones Sustainability Index (S&P Dow Jones Indices and RobecoSAM 2015). Only a few weeks before, Volkswagen had been recognized as the most sustainable company in the automobile industry (Volkswagen 2015). When it comes to classifications, the fraud and deception in the emissions tests managed to change Volkswagen's sustainability image from being an absolute frontrunner to being a sustainability wreck within just a few days. Although these revelations did not immediately result in bankruptcy, they ruined Volkswagen's image as a green, sustainable company.

In the present article, we provide a broad picture of the adaptation of economic classification technologies that were originally conceived to provide financial information and to classify companies according to their financial performance. Such technologies can now be used for the benefit of sustainability investors. These systems are similar to the classification situations examined by Fourcade and Healy (2017 [2013]). They analyzed actuarial techniques, such as credit scoring technologies, that triage individuals into classification groups and that "classify and price people" (Fourcade and Healy 2013, 559). At first glance, credit scores determine whether an individual is qualified to be given a loan, but such scorings also represent a "force that structures individual life" (ibid.). In contrast to Fourcade and Healy (2017 [2013]), we focus on ratings, accounting, and reporting as classification technologies. Although accounting and reporting are not, per se, classification technologies, they do provide important information for ranking companies, since companies actually apply these tools when disclosing information that investors use to make investment decisions. Credit rating tools routinely assess the creditworthiness of companies. Accounting and reporting standards define the measurement and the disclosure of their financial status. For a long time, financial markets were accustomed to companies being classified purely along the lines of their creditworthiness or financial performance.

The provision of data related to sustainability and, therefore, the classification of companies according to their sustainability performance, is a more

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recent phenomenon. Against a background of accelerating climate change, resource depletion, and declining biodiversity, companies are increasingly required to behave in a sustainable fashion, to report on the issue of sustainability, and to measure and account for it (Gray, Bebbington and Collison 2006). In the same manner, investors have begun to put pressure on financial markets to invest more sustainably, as such a change could drive the sustainable development for the entire economy (Haigh and Hazelton 2004; Louche and Hebb 2014). Therefore, companies are not only encouraged to develop sustainable business models, but also to set out reliable, comparable, and transparent corporate statements about their social and environmental impact. Due to these societal expectations, various initiatives have begun to provide comparable corporate sustainability declarations, as well as the corresponding classification structures which break down companies into sustainability classes (Waddock 2008).

We point out that the development and the functioning of a sustainable financial market has been inspired by tools that were formerly used for the financial classification of companies. This applies to ratings, as a direct tool of corporate classification, as well as accounting and reporting, which served as precursors for more formalistic classification of companies. What was previously and successfully used for the assessment of creditworthiness and financial performance of companies was then adapted to the formal and structured assessment of sustainability performance (about the "off-label" use of credit ratings, see Rona-Tas 2017, in this issue). On the one hand, sustainability rating agencies assess the sustainability performance of companies and countries. On the other hand, sustainability accounting and reporting frameworks seek to define which nonfinancial, sustainability-related corporate information should be disclosed and how such information should be measured or presented. Furthermore, we illustrate the difficulties associated with the adaptation of classification systems from finance to sustainability.

In this article, we initially compare the development and institutionalization of current classification systems based on financial and sustainability data, particularly considering the current structure of financial markets. We give a broad overview of both fields, and we canvass the main differences, in order to exhibit the opportunities and difficulties involved in the adaptation process. In doing so, we look at the conventional ratings, accounting, and reporting used for financial purposes. We describe the increased influence of financial markets and the growing importance of sustainability as two salient reasons for the adaptation of these tools to nonfinancial issues. We also show how ratings, accounting and reporting are used to provide information on and classify companies along sustainability lines. In the second section, we focus on sustainability accounting and reporting as the basis for providing reliable sustainability data. We present an illustrative case study on the operationalization of social sustainability as one facet of the concept of sustainability. We do this by comparing three different sustainability accounting and reporting initiatives. This

illustration provides insight into the ground-level data applicable to subsequent classification. Finally, based on brief insights in the development and institutionalization of classification systems, as well as the illustration on sustainability data, we merge both parts of the paper in a discussion about the opportunities and difficulties of the adaptation of ratings, accounting, and reporting of sustainability-related issues.

2. Financial Classification Systems: Ratings, Accounting, and Reporting

Financial accounting and reporting provide data that is used to classify companies according to their financial performance. Credit rating agencies not only predict the creditworthiness of companies, but also that of countries and other financial bodies. Financial accounting and reporting determine how to measure and disclose the financial performance of companies. This means that the range of tools available to classify companies according to their financial performance (or the instruments required to prepare information for such a classification) is comparatively limited. While the market for credit ratings is dominated by only three different agencies operating worldwide, financial accounting and reporting is highly standardized for public companies.

Credit rating agencies assess the creditworthiness of companies, municipalities, countries, or structured financial products. As intermediaries, they reduce the information asymmetry between debtors and creditors, since creditors often simply lack data related to their debtors' willingness and ability to repay their debts (Carruthers 2013; Sinclair 2005). The classic assessment of creditworthiness is primarily based on financial expertise and judgement, in which a group of rating analysts decides about the creditworthiness of the (potential) debtor on the basis of quantitative, as well as qualitative information. The results of their work are very reductionist. The judgement of the potential debtor's creditworthiness is presented in a classification system, in which an AAA-rated company is more likely to repay debts than one rated with BB or C (Hiss and Nagel 2012, 86-126; Langohr and Langohr 2008; Rona-Tas and Hiss 2010). Due to these credit classifications, borrowers do not have to evaluate each and every bond issuer themselves but can simply rely on the agency's credibility.

The market for credit ratings is structured as an oligopoly in which three agencies, *Moody's*, *Standard & Poor's*, and *Fitch*, dominate the market (White 2010). The roots of this market structure can be traced back to the railroad expansion in the United States towards the end of the 19th century. Due to large capital requirements, railroad companies relied on borrowed capital. In order to reduce the information asymmetry between potential investors and the railroad companies, a financial analyst named John Moody began to collect and to publish financial information on those companies (Olegario 2006; Sylla

2002). Since the beginning of the 20th century, credit rating agencies have used their well-known classification systems. Nevertheless, their methods to assess creditworthiness have evolved over time and have been strongly questioned in the aftermath of the recent financial crisis (Hiss and Nagel 2012).

Financial accounting and reporting display the "economic activity" of a company (Power 2012, 301). Historically, various national accounting and reporting practices were in place and impeded the comparability of companies across national borders. As globalization progressed, the need for transnational comparisons became obvious and in the 1970s, a process for standardizing accounting and reporting practices began (Botzem 2012; Botzem and Quack 2006). The International Accounting Standards Board (IASB) developed the globally recognized International Accounting Standards (IAS), as well as the International Financial Reporting Standards (IFRS). Both frameworks were rolled out globally and, to a certain extent, have been ensuring a comparability of companies' assets and liabilities around the globe ever since. By defining a set of standardized indicators, these standards determine what a specific economic event is and how companies are required to report about it (Baker and Barbu 2007; Haller 2002). Nowadays, albeit not free from criticism or competing standards, both international standards mentioned above are used by public companies in many countries around the world to provide financial data in a standard format that is, in turn, used for classification by credit rating agencies or investors thereinafter.

By and large credit ratings, as well as financial accounting and reporting, are widely legitimized and globally accepted methods to evaluate public companies. The results are presented in a manner financial markets can use for investment decisions. The data is, due to the market structures, easily comparable and usable for investors. In the case of credit rating agencies, the data which is readily available is intentionally substantially abridged. The data they deliver is easy to interpret and devoid of intercultural differences.

3. Reasons for Sustainability Classifications: The Growing Importance of Financial Markets and Sustainability

In this section we show how the increased influence of the financial markets and the growing importance of sustainability result in two reasons for the adaptation of classification systems regarding the issue of sustainability. Due to the deregulation and liberalization of the financial system, financial markets have enjoyed increasing importance in society since the 1970s. The increased influence of financial markets in society, which is one major aspect of the financialization processes (Bieling, Nölke and Heires 2013; Davis and Kim 2015; Froud et al. 2006; Krippner 2005; van der Zwan 2014), has affected the entire eco-

nomic system, because it has caused a shift from industrial capitalism to financial capitalism (Deutschmann 2005; Kädtler 2010; Windolf 2005, 2008).

There are several examples illustrating the increased influence of financial markets in society. In Germany, for example, there is an ongoing change from a bank-based to a market-based financial system. This was a catalyst that changed the orientation of companies towards shareholder value (Davis 2009; Deutschmann 2002; Faust, Bahnmüller and Fisecker 2011; Jones and Nisbet 2011; Krenn 2012; Lütz and Eberle 2008). The setup of a state-backed, private, capital-funded social security program in Germany is a luminous example of how actors and practices within financial markets can maneuver into spheres of the welfare state that were previously unconnected with the market (Ebbinghaus 2011; Frericks 2015; Naczyk 2013). Another example of the influence of financial markets is the financialization of accounting practices (Elad 2007; Perry and Nölke 2006). During this process a major change in accounting practices occurred: it was the shift from historical cost to fair value accounting (Power 2012), whereby "the 'fair' should be understood as 'useful' for investors" (Biondi and Suzuki 2007, 590). This change implies a "shift from professional to capital market governance," which replaces "the professional logic of coherent and encompassing standards for companies with limited liability […] by a logic of capital market efficiency for a few large companies listed on the world's largest stock markets" (Botzem and Quack 2006, 281).

The increased influence of financial markets in society has led actors, practices, and rationalities in the financial market to spread their wings into numerous social areas – among them sustainability. Sustainable investments are an example that illustrates the expansion of the influence of financial markets: it showed that the institutionalization of providing and classifying sustainability information for the benefit of investors is necessary. Although most investment decisions related to financial markets are still based on financial criteria, a growing number of investors complement those with nonfinancial or extra-financial measures (Hebb 2012; Hiss 2011; Sparkes 2002). Socially responsible or sustainable investors use ecological, social, and governance (ESG) criteria to enrich their investment decisions. That is where participants in the financial markets make use of sustainability, thereby setting expectations regarding sustainable businesses. As in the case of the financialization of accounting practices, the financialization of sustainability makes sustainability suitable for investors who are then able to use financial as well as nonfinancial information for their investment decisions (Hiss 2013).

However, in order to make use of sustainability, investors need reliable data on sustainability performance of their potential investments. While well-defined and relatively stable classification systems related to financial performance have been available for a long time, there is a growing market for data that is directly related to sustainable investments and it presupposes a similar data infrastructure. Investors concerned with sustainability need reliable and

comparable information that is easily digestible. By adapting financial classification models to nonfinancial areas, a mainstreaming of sustainable financial markets becomes possible.

While the rising power of financial markets is one factor driving the adaptation of classification systems related to sustainability, the increasing relevance and importance of sustainability is another one. The origin of the term sustainability can be traced back to German forestry in the early 18th century but it was not until 1987 that sustainable development received serious attention (Du Pisani 2006). The Brundtland report by the World Commission on Environment and Development (1987) and the subsequent United Nations Conference on Environment and Development in Rio de Janeiro in 1992 enabled the breakthrough of sustainability to become a guiding concept for contemporary societies (Castro 2004; Redclift 2005).

Nowadays, companies are not only encouraged to develop sustainable business models, but also to transparently disclose corporate information about their social and environmental impact. Companies are confronted with different expectations and demands from various stakeholders to act sustainably and to report about it (Hess 2007; Hiss 2009; Winn and Pogutz 2013). Trade unions ask for fair wages and good working conditions throughout the supply chain. Human rights associations demand the abolition of child labor from all suppliers. Environmental associations not only insist on the reduction of carbon emissions; they also affirm the need for a less negative impact on biodiversity.

Despite its growing importance, sustainability is still an ambiguous concept. A generally accepted definition of what sustainability means and encompasses does not exist (Bañon Gomis et al. 2011; Hopwood, Mellor and O'Brien 2005). The definition of sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987, 41), as well as the triple bottom-line model of sustainability (Elkington 1997), conceptualizing sustainability as comprising environmental, social and economic aspects, are well-known and widely respected. But the environmental, social, and economic components of the concept are still open to interpretation (Åhman 2013; Bell and Morse 2008; Vallance, Perkins and Dixon 2011).

While the ambiguity of sustainability may enable companies to choose which of the various expectations they wish to fulfill and how they wish to report about them, this vagueness may also prove to be an obstacle to the desired sustainable development of the economy. A lack of effective monitoring systems could complicate the establishment of trust in the sustainability performance of companies (Mueller, dos Santos and Seuring 2009; Parguel, Benoît-Moreau and Larceneux 2011; Sethi and Schepers 2014). In order to enhance the effectiveness of sustainability as a guiding concept, even under the auspices of the financial markets, the level of ambiguity related to sustainability needs to be mitigated. Therefore, the increased influence of financial markets

and the growing importance of sustainability require more standardized methods of assessing sustainability performance. And these methods need to be applicable and usable by sustainability investors and sustainability rating agencies. One way or another, both processes drive the adaptation of financial classification systems to sustainability.

4. Sustainability Classification Systems: Ratings, Accounting, and Reporting

Inspired by their financial counterparts, sustainability ratings, accounting, and reporting have been developed to provide corporate sustainability information and, in the case of ratings, to classify companies according to their sustainability performance. While ratings, accounting, and reporting used to be only used for financial purposes, these classification systems are now used to enable sustainable financial markets by enhancing the credibility of corporate information on their sustainability for investors, analysts, rating agencies, and other stakeholders.

In contrast to the field of financial classification, the field of sustainability classification is characterized by a great heterogeneity of approaches and actors (see Table 1). Not only have several sustainability rating agencies attempted to classify companies according to their social and environmental impact, but also various sustainability accounting and reporting initiatives have developed different frameworks for the comprehensive measurement and disclosure of sustainability data.

Table 1: Comparison of Financial and Sustainability Classification Systems and Their Predecessors

	Financial classification		Sustainability classification	
	Rating	Accounting and reporting	Rating	Accounting and reporting
Content of classification	Creditworthiness	Financial performance	Sustainability performance	
Field structure	Oligopoly	Standardized	Heterogeneity	
Market signals	Unequivocal and unidirectional		Diverse and multi-directional	
Examples of actors	Moody's; Standard & Poor's	International Accounting Standards Board	EIRIS; Oekom Research	Global Reporting Initiative; Sustainable Development Management GmbH

Source: authors' illustration.

The emergence of sustainability rating agencies dates back to the 1970s, when the New York-based Council on Economic Priorities began to gather information about the social and ecological performance of companies (Lydenberg 2005; Sparkes 2002, 280). In 1989, the first sustainable investment research and rating firm – Kinder, Lydenberg, and Domini (KLD) – was founded. One

year later, KLD published the Domini 400 Social Index, one of the first stock indices to incorporate sustainability criteria into its calculations (Sauer 1997). Since then, more and more rating firms have been established to gather, evaluate, and publish sustainability data about companies.

Today, several specialized sustainability rating agencies act as intermediaries to provide data about the sustainability performance of companies and countries for the use of those investors willing to consider sustainability issues in their investment decisions (Scalet and Kelly 2010; Schäfer et al. 2006). They gather publicly available information from several sources, including corporate reports, nongovernmental organizations and the media. Additionally, they often speak with company representatives or send questionnaires to obtain additional internal corporate information. Finally, a mixture of ecological, social, and governance aspects, for example, the corporate impact on climate change or biodiversity, working conditions along the value chain, or gender diversity within the management, contribute to the ratings (Elkington and Beloe 2000; SustainAbility 2010b). The result of these ratings is, similar to credit ratings, often symbolized by letters. Therefore, companies rated with A perform better in terms of sustainability than companies rated with C. As with credit ratings, the classifications based on sustainability performance can also be used to define a specific investment portfolio, by including or excluding investment opportunities that do or do not meet pre-determined criteria.

In contrast to the credit rating market, the market for sustainability ratings is characterized by its heterogeneity. Many different organizations assess sustainability performance in order to classify companies; more than fifty different agencies and approaches were available in 2010 (Schäfer et al. 2006, SustainAbility 2010a, 3). Among them are several major agencies that provide their services globally as EIRIS, Inrate, MSCI, Oekom Research, Sustainalytics, and Vigeo.

The idea of sustainability accounting and reporting emerged in the 1960s as social accounting, where it was part and parcel of theoretical discussions related to the measurability of social and environmental performance of various entities. In the 1990s and 2000s, stand-alone sustainability reports began to gain importance, primarily as a result of pressure from nongovernmental organizations (Gray, Dillard and Spence 2009; Lamberton 2005; Schaltegger and Wagner 2006). Today, several initiatives provide frameworks for the disclosure of sustainability data which we differentiate into three instruments: The information can be published either in the form of a sustainability report, an integrated report or as a part of corporate accounting. The shared goal of the various initiatives is to inform investors and other stakeholders about the sustainability performance of companies (Schaltegger, Bennett and Burritt 2006; Searcy and Buslovich 2014). By establishing a framework that integrates the issue of sustainability into the basis of what they do, the initiatives encourage companies to collect, measure, and disclose comparable information about their nonfinancial performance, as well as the social and ecological impact of their

activities. Investors, analysts, rating agencies, and other stakeholders can use this information to value, classify, and compare different companies.

Compared to traditional financial accounting and reporting, no dominant sustainability accounting and reporting standard has thus far been established. The inherent flexibility of the directive 2014/95/EU of the European Union reflects a plethora of options companies can use to inform their stakeholders. This directive relates to the disclosure of environmental, social, and diversity-related issues and applies primarily to large companies. Its intent is to enable a comprehensive view of companies for investors and other stakeholders, but it does not prescribe precisely how companies are required to disclose this information (European Commission 2016; European Parliament and Council of the European Union 2014; Kinderman 2015).

We break down the current field of accounting and reporting into three different instruments: sustainability reporting, integrated reporting, and sustainability accounting (Christofi, Christofi and Sisaye 2012; Eccles and Krzus 2010; Freedman and Jaggi 2010; Gazdar 2007). In the first case, sustainability reports are published in addition to the traditional, standardized financial reporting. For example, they typically include disclosure guidelines, as well as pertinent data related to, for example, significant actual and potential negative impacts for the labor practices within the supply chain. Second, integrated reporting initiatives seek to incorporate nonfinancial information in financial statements and to eliminate segregated disclosure of financial and nonfinancial information. For example, the effects of the supply chain on companies should be considered in corporate reporting. The goal of this particular process is to support a holistic manner of thinking within and outside of companies. Third, sustainability accounting aims to integrate quantitative nonfinancial information into companies' financial statements. It uses key performance indicators (KPIs), which define the disclosure of quantitative data, such as the total number of suppliers or the amount of CO_2 emissions.

Relevant reporting initiatives include the Global Reporting Initiative (GRI), the King Code of Governance Principles for South Africa, and the UN Guiding Principles Reporting Framework (UNGP Reporting Framework). Integrated reporting is primarily promoted by the International Integrated Reporting Council (IIRC). A variety of initiatives have developed accounting frameworks related to sustainability. Among them are the European Federation of Financial Analysts Societies and the German Association of Financial Analysis and Asset Management (EFFAS/DVFA), the consulting firm Sustainable Development Management GmbH (SD-M), the Sustainability Accounting Standards Board (SASB) and the Prince of Wales by founding Accounting for Sustainability (A4S).

Despite the proximity to classification systems that are already known within the financial field, the field of sustainability classification has developed almost independently from credit rating agencies and conventional financial accounting standards. With the exception of the foundation for sustainability reporting, the

instruments – as well as the participants – differ from their financial counterparts. An entirely new market has emerged in which those involved still attempt to establish ways to provide relevant sustainability data and to classify companies by sustainability performance, thereby, making sustainability useful and suitable for investment decisions.

5. Illustrative Case Study: Sustainability Accounting and Reporting

We would like to use an illustrative case study in order to provide insight into the data applicable to subsequent classification of sustainability performance. We focus on the fundamental data and the interpretation of social sustainability based on three sustainability accounting and reporting initiatives. All three initiatives intend to standardize the measurement and the disclosure of corporate sustainability data by creating the corresponding frameworks, KPIs, and guidelines. We demonstrate how these initiatives operationalize the ambiguous concept of social sustainability and translate it into something useful for investors and other stakeholders. By doing this, we acknowledge how widely data requests related to corporate sustainability performance can differ, both in nature and in scope. Therefore, we highlight the content-related heterogeneity in the field of sustainability accounting and reporting, both as precursors to classification opportunities.

We focus on social sustainability because the requirements and limits of it are less defined, when compared to its environmental counterpart. Environmental issues tend to dominate the debate about sustainability, and they are most likely fueled by increased awareness of the earth's limitations and climate change (Jackson 2011; Meadows et al. 1972; Stern 2007). Social aspects rarely appear in the discussions about sustainability and they often only appear to the extent that social cohesion is determined to be part of any conceivable solution for ecological problems (Bebbington and Dillard 2009; Colantonio 2011). Arguably, this lack of focus is reinforced by the lack of a clear definition as to what social sustainability really is, since theoretical constructs about the concept have not yet been created and the concept tends to be rather diffuse (Åhman 2013; Dempsey et al. 2011; Weingaertner and Moberg 2014). For the reasons mentioned above, initiatives are encouraged to base their frameworks on individual interpretations.

5.1 Sustainability Accounting and Reporting Frameworks

In order to compare how social sustainability becomes assessed by sustainability accounting and reporting initiatives, we examine three different frameworks that are key drivers in the field of sustainability accounting and reporting. First,

the accounting initiative Key Performance Indicators for Environmental, Social & Governance Issues 3.0, second, the accounting framework Sustainable Development-KPI Standard, and third, the reporting initiative G4 Guidelines.[2] A short description of the initiatives that were developed within these frameworks follows. Afterwards, we illustrate in detail how the frameworks operationalize social sustainability.

The first framework, the Key Performance Indicators for Environmental, Social & Governance Issues, Version 3.0 (KPIs for ESG 3.0), was launched in 2010 by EFFAS, the European Federation of Financial Analysts Societies, and by the DVFA, the German Association of Financial Analysis and Asset Management (*Deutsche Vereinigung für Finanzanalyse und Asset Management e.V.*). As an accounting initiative, their framework is based on a KPI set used for the integration of nonfinancial information into corporate financial reporting (EFFAS European Federation of Financial Analysts Societies and the DVFA Society of Investment Professionals in Germany 2010). EFFAS was founded in 1962 as an association for investment professionals. DVFA is the German professional association for investment professionals and a member of EFFAS. It was established in 1960 in order to institutionalize equal opportunities for all parties within the financial markets, to provide professional framework conditions, and to optimize expertise, transparency, and fairness within the global financial system. Although their set of KPIs is suitable for all companies, regardless of size, scope or legal form, it was specifically designed for public companies, as well as for issuers of bonds. The interests of "economic stakeholders in general and investment professionals in particular" (ibid., 8), as well as those of investment professionals and potential users were included in the development process. Therefore, the set of KPIs is associated with the global financial system via the STOXX ESG Global Leaders index.

The second framework, the Sustainable Development-KPI Standard, was developed between 2004 and 2010 by SD-M, the German consulting firm Sustainable Development Management GmbH, with the German Federal Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety, auditors, investors, and analysts. This is an accounting framework that promotes the global standardization of integrating nonfinancial information into corporate reports (Hesse 2007, 2010). The framework is mainly oriented towards the interests of investors, analysts, and rating firms. By using indices such as the EURO iSTOXX® 50 SD-KPI and the iSTOXX® Europe 50 SD-KPI, this framework is closely connected to financial markets (Hesse 2004; SD-M

[2] We do not incorporate integrated reporting by the International Integrated Reporting Council (IIRC) as it does not offer an operationalization of sustainability itself. Its approach causes one to rethink corporate value creation and to integrate sustainability information into corporate reports. This initiative refers to other frameworks, e.g., the guidelines by the Global Reporting Initiative (GRI).

2014). Overall, the implementation of nonfinancial information into corporate reports by this framework aims to improve financial performance.

The third framework, the G4 Guidelines, was developed by the network-based nongovernmental organization GRI, the Global Reporting Initiative. Based on input from multiple stakeholders, including business, civil society, labor, accounting, investors, academicians, governments, and sustainability reporting practitioners, the GRI published the fourth version of its framework in 2013 (Brown, de Jong and Lessidrenska 2009; Global Reporting Initiative 2013a). The GRI describes itself as the leader in the sustainability field (Tata Consultancy Services Limited and Global Reporting Initiative 2015, 1). Its framework aims to improve the quality of sustainability reporting and to standardize sustainability disclosure by creating "the sustainability equivalent of the generally accepted accounting principles for financial reporting" (Gleeson-White 2015, 123).

5.2 Operationalization of Social Sustainability

Based on the various frameworks, we compare how social sustainability is operationalized. In other words, we examine the design of indicators used to define specific aspects of social sustainability. The question ends up being whether the indicators require qualitative or quantitative information, whether the verbal formulation of the results is open to interpretation, and whether the indicators require rather simple or more detailed information. For reasons of comparability we show our analysis based on two different aspects of social sustainability, each of which is covered by all frameworks: value and supply chain, as well as health and safety.

The first framework, KPIs for ESG 3.0, operationalizes social sustainability, by primarily requesting quantitative, precise and simple information. For example, the indicator KPI S06-01, linking supply chains to ESG criteria, requires companies to disclose the "[p]ercentage of total suppliers and supply chain partners screened for compliance in accordance with ESG-criteria" (EFFAS European Federation of Financial Analysts Societies and DVFA Society of Investment Professionals in Germany 2010, 56). The indicators S04-03 II and S04-04 II focus on the health of workers. They require reporting on the total number of fatalities and injuries in relation to full-time equivalents (ibid., 98). Therefore, this framework defines precise and comparable information companies are required to disclose. Investors and other stakeholders can easily interpret and compare these types of information from different companies.

The second framework, the SD-KPI Set, principally operationalizes social sustainability by requesting quantitative and vague information. As this framework is part of a paid service by SD-M and the sustainability rating firm Sustainalytics, their indicators cannot be applied by the companies themselves, for which only short and rather vague specifications are publicly available (SD-M

GmbH [n.d.]). Guidelines for the use or interpretation of the framework are not available. Measures that were collected from a previous survey are available and are assumed to be a valid indicator of the methodology. Nevertheless, if and how these measures are used in the actual accounting process remains undisclosed. In the 2010 version, an indicator for the real estate sector relates to the "[a]udit coverage of ILO labour standards in-house and for subcontractors", including possible criteria such as "[t]he number of fatalities, lost-time injuries, cases of alternative work necessitated by an injury and other recordable injuries, excluding first-aid injuries per million working hours for employees and especially for subcontractors" (Hesse 2010, 93). Another example from 2010 is an indicator on "Health & safety performance" for the energy sector which covers the health of workers; it includes possible measures such as "Labour conditions for workers at drilling wells" and "Reporting on Accident Rates, Fatalities and Programs to Address Employee Health & Safety" (ibid., 15). Nonetheless, most of the possible measures used for this framework require quantitative information, but lack in providing more details.

The third framework, the G4 Guidelines, operationalizes social sustainability by requesting qualitative, quantitative, precise and rather detailed information. By publishing two documents, the Reporting Principles & Standard Disclosures (Global Reporting Initiative 2013c) and the Implementation Manual (Global Reporting Initiative 2013b), the GRI gives companies extensive data on how to use the guidelines. It also gives other stakeholders meaningful information on how to interpret the data that is disclosed. For example, the guideline G4-LA7 asks for the disclosure of data regarding diseases and the risk of diseases within the staff. The GRI specifies: "Report whether there are workers who are involved in occupational activities who have a high incidence or high risk of specific diseases" (Global Reporting Initiative 2013c, 67). The indicator G4-LA14, representing aspects of social sustainability in the value and supply chain, requires the "[p]ercentage of new suppliers that were screened using labor practices criteria" (Global Reporting Initiative 2013b, 69). Additionally, this indicator is also further specified in the manual, a fact that gives insight into the importance of this data, possible definitions, and sources of documentation (ibid., 155). All in all, the GRI asks companies to report qualitative and quantitative nonfinancial information and gives detailed instructions on how to gather and interpret the data.

5.3 Results

Our case study illustrates that sustainability accounting and reporting initiatives use rather different information to assess and classify companies. While accounting initiatives reduce the concept of social sustainability to a few quantitative issues, the reporting initiative combines quantitative and qualitative data

to provide more extensive data. At the end of the day, they all have different definitions as to what is relevant in regards to social sustainability.

The core difference between sustainability accounting and sustainability reporting is that accounting initiatives use sets of KPIs, while the reporting initiative uses reporting guidelines that result in different ways of operationalizing social sustainability. KPIs are quantitative instruments that promote the integration of quantitative nonfinancial information into corporate financial statements. The multifaceted and ambiguous concept of social sustainability is sharply reduced to its quantifiable aspects. In contrast, sustainability reporting initiatives promote the disclosure of both qualitative and quantitative aspects of sustainability. Naturally, information has to be reduced for reporting purposes, too, but more complex data can be disclosed. As a result, a more extensive concept of social sustainability remains after its operationalization by sustainability reporting initiatives.

Overall, sustainability accounting and reporting initiatives provide a form of data infrastructure for sustainability investors that may support the further mainstreaming of sustainable investments. The growth of this market segment is inseparably linked to an information infrastructure that ensures access to comparable, credible, and meaningful information about the sustainability performance of companies. However, as this case study illustrates for sustainability accounting and reporting frameworks, it is questionable whether classification systems would be able to sufficiently provide credible and meaningful classification criteria.

Credible and meaningful classification criteria about financial or sustainability performance depend on assumptions, definitions, and the operationalization of financials or nonfinancials. Classification of sustainability performance is, as its financial counterpart, not just an objective assessment of distinct facts, but rather a subjective evaluation with a rather large amount of leeway subject to interpretation. While the subjective nature of financial classifications is veiled by the homogeneity and stability within the field and only becomes visible in times of financial crisis, the subjectivity of sustainability classifications is indubitably demonstrated by the heterogeneity within the field and what remains as an ambiguous concept of sustainability. The question of whether a standardization of sustainability classification is desirable as it may further objectify nonfinancial information, or whether some sort of differentiation of financial classification might be preferable (as it may reveal their subjectivity) is part of the concluding discussion, in which we consider the impact of the adaptation of financial classification systems to sustainability.

6. Discussion

In this contribution, we have outlined the development and institutionalization of classification technologies in the financial markets, based on financial and sustainability data. As the development of sustainability classification systems has been inspired by their financial counterparts, it is worthwhile discussing the consequences of the adaptation of financial classification systems to the issue of sustainability.

The use of ratings, accounting, and reporting for financial purposes is less equivocal than the manner in which their sustainability counterparts use them. *Standard & Poor's*, *Moody's*, and *Fitch* dominate the global market for credit ratings. The accounting and reporting standards IAS and IFRS are used by public companies globally. These few market participants exert strong standardizing influence on financial data. In contrast, several sustainability rating technologies as well as accounting and reporting frameworks, compete with each other. Compared to its financial counterpart, the field of sustainability classification is more heterogeneous, resulting in more diverse and less clear-cut information, which lacks in integrative measures to allow meaningful company comparisons.

Within the field of corporate finance, uniform and consistent perceptions do exist about the nature of creditworthiness and about good and poor financial performance. For both, best practices have been legitimized and are commonly accepted. Within this mold, it is difficult for alternative perceptions of creditworthiness or financial performance to prevail. The classic viewpoints tend to be taken for granted. As seen in the case study, the sustainability sector is lacking in a single, generally accepted best practice, as discovered when we observed a variety of competing sustainability perceptions. The negative side of this variety lies in the lack of credibility or trust with each of the competing standards. Given the operating classification systems, financial markets are risky and poorly resilient. As soon as primary indicators point to a negative direction, as was the case during the Subprime Crisis of 2007, the result could very well be rapid market failure, because of the fact that all players in the market tend to follow the same signals. They, therefore, move into the same direction. In this sense, sustainability markets tend to be more resilient. Their market signals comprise a menagerie of factors and there tends to be less risk of lemming-like behavior. Here, the downside is epitomized by a lack of credibility given by the market.

Nonetheless, classification systems are indispensable for market creation and as social governance instruments. Sustainability classification systems create sustainability directions that participants in financial markets can work with. Put differently, classification systems enable social order and, hence, enable markets. But the difficulty for classification systems is to get the right balance between a crucial reduction of social complexity and sufficient allowance for diversity and

scope of interpretation. In other words, they need to find a balance between homogeneity and heterogeneity, between efficiency and resilience.

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